

Worksheet to Identify Potential Indicators for Ecological Monitoring

You return to visit your park in 20 years and walk through the park with the current resource manager. The manager tells you about the current condition of the natural resources, the management issues, and threats of the day. What would that person describe to you?

Ruthann - Issues are bison management, stable mixed-grass prairie, exotics are non-threatening due to past control, there is an ongoing IPM program to control exotic plants, Siberian iris will remain an exotic issue at the park an effect on wetland communities, will have a diverse deer population, i.e., white-tails will not take over, there will continue to be a good fishery.

Bill – Chronic wasting disease could be an issue both to deer and domestic livestock, would like to have good fishery, too many visitor.

Lil - Weeds and the health of the river.

Kim – Irrigation upstream of river is depleting flows, could effect potential fishery.

What are the communities at your park (e.g., native mixed-grass prairie, barren badlands topography, prairie stream, forested riparian area) and approximate percentage of total area?

Terrace mixed-grass prairie is 70%

Breaks community is 10%

Wetland 10%

Disturbed areas with history of cultivated for 1 year 2%

Disturbed areas used for corrals 3%

Cottonwoods < 1%

Gravel washes <1%

What are the park's most significant natural resources (e.g., the river and its tributaries, caves and cave fauna, rare plant communities, elk herd)?

Fossils and geology

River and wetlands

Vista

Soundscape

The prairie

What does your park contribute to regional biological diversity (e.g., what natural resources are preserved and protected at your park that are altered or threatened throughout the rest of the region)?

The comparatively lightly grazed native prairie

Cryptogamic soil

Population of snapping turtles

Wetlands because lightly grazed, recharge and springs may differ from other reaches

What park-specific legislative mandates direct the park to monitor a particular natural resource at your park.

Fossils and geology.

What federally-listed threatened and endangered species are known to occur in the park?

No

What state-listed threatened and endangered species are known to occur in the park?

Six state-listed plants. No animals.

What is that status of your park's management plans?

No GMP. Promised for funding in 04. RMP done in 96 – needs significant review. Operate under 1966 Master Plan written pre-land acquisition.

What is currently being monitored at or near the park by NPS or other entities (e.g., plants by fire effects program, plants by LTEM, exotic plants by exotic plant teams, birds by Breeding Bird Survey, butterflies, stream by USGS, Christmas bird count, weather data, NRCS photography, visitors by park staff, state roadside counts --- use the checklist below)?

Air: NPS FirePro funded RAWS managed by WICA, Remote Automated Weather Station hourly just outside headquarters building. Rangers daily collect data for NOAA on weather sheets on separate equipment (temp and precip and snow depth), not reimbursed for latter.

Amphibian: No.

Birds: *LTEM periodic using point counts with distance sampling in all habitats. Included on observation cards. Look at BBS transect.*

Fire: *No prescribed burning.*

Fish: *Observation cards. Old studies but no known fish monitoring.*

Geology/Fossils: *Park reports rockfalls and other events.*

Mammals: *Nothing. Observation cards.*

Meteorology: *see air. Park has old climatological data.*

Pests: *Casual observation by park staff of porcupine damage, pocket gophers, rattlesnakes.*

Pesticides/Herbicides: *Monitoring what is used, amount, and where.*

Reptiles: *Observation cards and casual observations of rattlesnakes. Separate Snake Log (i.e., database) for all snakes as observed by visitors and park staff.*

Soils: *Monitoring soil moisture and temperature at bio-control release sites and treatment sites. Conducted by park staff.*

Sound: *None.*

Vegetation: *LTEM monitoring program (both rare plant and community). Park monitors thistle. WICA Fire Effects folks. Canadian thistle and other exotics monitored by County based on observations and reports.*

Visitors: *Monitoring visitor satisfaction, numbers, safety, GPRA using established nation-wide NPS survey (Gary Machlis' survey).*

Visual Landscape: *No formal monitoring.*

Wildlife Disease: *Informal monitoring of external symptoms for CWD.*

Water Quality: *Macro-inverts by LTEM and park. Park monitors wells twice a month for drinking water standards.*

Water Quantity: *Park monitors one USGS gauge at Agate Springs ranch (USGS abandoned – park has copies of old data). Continuous data; park commonly records about 3 times a week. Irrigation withdrawals monitored by state above and below park.*

What are the stressors on park resources? What are the sources of each stressor?

- * Lack of grazing affects prairie vegetation, riparian vegetation.*
- * Altered, i.e., suppressed fire regime.*
- * Altered river flows quantifies, i.e., hydrographs due to irrigation withdrawals from Nebraska only (no upstream dams), increased vegetation growth along river in park (due to lack of grazing and fire).*
- * Altered water quality due to cow waste upstream. Water quality altered due to fertilizers, herbicides, urban waste from Lusk.*
- Altered/reduced ground water and spring flows due to irrigation withdrawals.*

Items not considered stressors are visitors, traffic.

For your park, what are some monitoring questions relating to external natural resource threats (e.g., does the water quality of Cub Creek meet EPA's Clean Water standards? Are exotic plants displacing native species in prairie remnants? Is urban encroachment changing deer populations within the park?)?

Does Niobrara water quality and quantity meet goal of healthy ecosystem?

Are exotic plants coming into the park?

Is CWD coming into park?

Northern pike and brown trout.

Is Siberian iris affecting native vegetation.

Are landscape factors changing the relative abundance of white-tailed and mule deer.

What are some monitoring questions relating to current internal natural resource management actions (e.g., is the prescribed fire regime maintaining healthy native prairie?)?

- *Is the forthcoming prescribed fire program working to maintain nature vegetation composition, structure, etc.*
- *Are the park's exotic plant control efforts successful.*
- *Are visitors adversely affecting geologic resources.*

What are some potential indicators of resource decline or improvement (e.g., water chemistry, fish community, aquatic macroinvertebrates, exotic species distribution or abundance, plant community composition, deer density, browse-line) due to the external and internal threats?

Macro-inverts as indicators of water quality and quantity.

Plant communities as indicators of terrestrial systems.

Deer as indicators of landscape and habitat.

Fish as indicators of water quality and quantity.

Turtles?

What potential management actions in the future may require monitoring (e.g., potential species reintroductions, land acquisitions, commercial uses)?

Potential bison reintroduction

Potential brook trout

What would your partners like you to monitor?

County, neighbors, state, tribes want to monitor for noxious weeds.

CWD

Water quality because one of few data points in this area

Scientific community (and some in Native American community) wants monitoring of the fossils

What current research is occurring at the park (research differs from monitoring in that it is typically of shorter duration, say 2-3 years)?

Sabin doing dissertation on geomorphology of Niobrara Valley

Stromberg doing dissertation on Miocene vegetation

Weedon doing book on vegetation at park

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Vital signs are: 1) sensitive enough to provide early warning of change, 2) have low natural variability, 3) can be accurately and precisely measured, 4) have costs and effort of measurement that are not prohibitive, 5) have monitoring results that can be interpreted and explained, 6) are low impact to measure, and 7) have measurable results that can be replicated with various personnel. Off the top of your head, look into your crystal ball and choose several vital signs to monitor over time to track the condition of natural resources within your park (items can range from broad, e.g., the stream, to narrow, e.g., a particular species). What are those vital signs? Rank them in order of importance.